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The sixth part of Vol. 9 concludes the presentation of the *Agaricaceae* by MURRILL,⁵ 5 genera being presented, which include 165 species, 16 of which are described as new. The largest genus is *Clitocybe*, with 88 species and including 13 of the new species. The part closes with a list of corrections and a bibliography for the volume.—J. M. C.

Jackson's glossary.—A third edition of this well known volume has appeared.⁶ The development of subjects in botany and the consequent growth in terminology has made a new edition imperative. Especially is this true in reference to the numerous "recently coined terms" in ecology. No glossary can be perfect, and it would be easy to pick flaws in this one, but it must be regarded as complete and trustworthy as such a book can be. It contains approximately 21,000 terms, so that it must be fairly representative of botanical terminology. With the increasing number of special fields of botany, even a trained botanist needs a convenient glossary on his shelves.—J. M. C.

Correspondence of Linnaeus.—Under the editorship of HULTH, the correspondence of LINNAEUS is to be published in a series of volumes, the first one of which has just appeared.⁷ The collection includes letters "from and to" LINNAEUS. The extent of the correspondence is indicated by the fact that this first volume, of over 400 pages, includes 49 correspondents listed under the first two letters of the alphabet. Most of the letters are in Latin, and give an intimate and interesting picture of the biology and biologists of the Linnaean period.—J. M. C.

NOTES FOR STUDENTS

Cecidiology.—Three interesting American papers on the histology of galls have been published recently and demonstrate the increasing interest in the study of pathogenic structures.

STEWART⁸ presents a very interesting paper on the anatomy of *Peridermium* galls. The studies were made from *Peridermium cerebrum* Pk. on *Pinus Banksiana* Lamb. Galls of various ages were used, but all of them from young branches. It appears that the infection usually takes place during the first year's growth of the shoot. The woody portion of the gall was very distinct from the normal tissue. The author summarizes his results as follows:

⁵ *Op. cit.* Agaricaceae, by W. A. MURRILL. 9:375-426. 1916.

⁶ JACKSON, BENJAMIN DAYDON, A glossary of botanic terms, with their derivation and accent. 8vo. pp. xii+428. Philadelphia: Lippincott. 1916. \$3.00.

⁷ HULTH, J. M., Bref och Skrifvelser af och till CARL VON LINNÉ. Vol. I. ADANSON-BRUNNICH. 8vo. pp. viii+429. Upsala: Akademiska Boktryckeriet. 1916.

⁸ STEWART, ALBAN, Notes on the anatomy of *Peridermium* galls. Amer. Jour. Bot. 3:12-22. 1916.

"(1) both an alternate and an opposite arrangement of bordered pits in the radial walls of the tracheids; (2) an unequal thickening of the walls and lumina of the tracheids; (3) very short tracheids with blunt end walls, which resemble parenchyma cells except in the pitting; (4) cells which are transitional between tracheids and parenchyma cells in the pitting; (5) the presence of true wood parenchyma cells; (6) a small production of thin-walled summer tracheids; (7) a probable absence of bars of Sanio from many of the tracheids; (8) an increase in the number of rays in the gall wood; (9) a tendency toward the production of multiseriate rays; (10) ray tracheids which are transitional between those of hard and soft pines; (11) the presence of a balled or whorled arrangement of tracheids in the tangential sections; (12) a great increase in the number of resin canals in the gall wood, but no such increase in the uninfected wood close by. The examination of this gall has revealed so many points of anatomical interest that a further study of this subject seems to be worth while. On this account the author expects from time to time to issue other papers on the anatomy of *Peridermium* galls on pines and other conifers." It remains for someone to make a study of the very early stages of this and many other abnormal plant growths.

ROSEN⁹ has made a study of the histology of the grape leaf gall. The author has made a study of this gall from its very earliest stages to its maturity. He summarizes his results as follows: "(1) the *Phylloxera vastatrix* leaf gall starts to develop on embryonic bud leaves; in 24 hours the insect produces a depression at the periphery of which hairs are formed on the upper surface of the leaf; the depression is due to a lessened growth of the attacked mesophyll; (2) after 3-4 days of insect attack the lower half of the leaf tissue which surrounds the portion in which the proboscis is inserted has proliferated enormously; the whole thickness of the leaf in the region immediately around the proboscis shows no proliferation; that portion of the leaf which is beneath the insect does not proliferate, but the upper half at the sides of the insect grows and forms the walls of a large insect cavity; upper epidermal cells and several layers of mesophyll cells in the portion of the gall below the insect show peculiar thickening and dissolution of their cell walls; (3) gall development depends upon leaf development; when the leaf reaches its maximum size, after 12-15 days of development, the gall becomes mature; (4) a mature gall shows but slight cuticular development and very few stomata; the mesophyll is a huge mass of compact, thin-walled, partly empty cells, some of which are undersized, and others enormously elongated; the vascular elements are scattered by wedges of parenchyma cells; many unicellular and multicellular hairs grow out from the gall; (5) chemical work on this gall shows it to be a structure in which anabolic processes are lacking, and in which large amounts of simple sugars and simple proteins are present; (6) the development of this gall does

⁹ ROSEN, HARRY R., The development of the *Phylloxera vastatrix* leaf gall. Amer. Jour. Bot. 7:337-360. 1916.

not seem to support the theory that the insect injects some chemical into the leaf which causes gall formation; (7) intumescences produced by chemical sprays result from entirely different kinds of hyperplastic responses than hyperplastic gall growth; (8) the investigation establishes the fact that the proboscis may pass through the entire thickness of the leaf; (9) the insect remains fixed, and that portion of the leaf in which the proboscis is fixed is marked by lack of growth as compared with the huge outgrowths which surround it; (10) the continuous sucking action by the insect at one fixed point for fifteen days is believed to be the initial stimulus for gall development."

Another very interesting paper is by WELLS,¹⁰ who has made a study of the galls of our common American hackberry. The purpose of the paper as stated by the author is as follows: "(1) to present a survey of the known insect and mite galls of *Celtis occidentalis* L.; (2) to elucidate the history of the normal gall-bearing parts of the hackberry and that of the galls; (3) to study comparatively the structures treated, pointing out any significant conclusions and generalizations that may be attained in such a study." The author gives excellent descriptions of the external and histological character of the galls and concludes the paper with the following summary: "(1) there are 17 known species of zoocecidia occurring on *Celtis occidentalis*, belonging to 4 orders of arthropods (Acarinae 1, Lepidoptera 1, Hemiptera 5, Diptera 10); all are heteroplasias, that is, those forms of hyperplasias (abnormal increase in size through cell proliferation) whose cells and tissues differ from the normal; all, be it noted, are built up on the basis of the same germ plasm, namely, that of the single species of the plant mentioned; (2) the acarinous and lepidopterous galls are kataplasmas of those forms of heteroplasias whose cells and tissues do not vary widely from the normal; each shows specific and characteristic inhibition of differentiation; (3) the hemipterous and dipterous galls are prosoplasmas of those forms of heteroplasias whose cells and particularly whose tissue forms differ fundamentally from those of the normal parts; (4) in the prosoplasmas the types of cells found are closely comparable to those of the normal plant parts, but the tissue forms discovered are fundamentally new; no analogous structure forms are to be found in the tissues of the normal plant or its allies; (5) in the dipterous prosoplasmas, since the gall's specific tissue form characters are related to the species of insect, we have the unique case of the 'overlapping' of the hereditary constitution of an animal on that of the plant in the sense that factors associated with the insect determine the form character locally, rather than those normally associated with the plant's germ plasm; these latter plant factors suffer suppression; (6) it is suggested that in the field of zoocecidiology we probably have a unique place, heretofore unrecognized, to attack the problem pertaining to the mechanism used in the expression of hereditary characters." The paper is well illustrated.—MEL T. COOK.

¹⁰ WELLS, BERTRAM W., The comparative morphology of the zoocecidia of *Celtis occidentalis*. Ohio Jour. Sci. 16:249-290. 1916.